

Peer Review Report

Review Report on You can't climb a broken ladder: Examining underrepresentation of multiplydisadvantaged groups in secure and senior roles in UK geochemistry

Original Research, Earth Sci. Syst. Soc.

Reviewer: Rebecca Williams

Submitted on: 08 Jan 2024

Article DOI: 10.3389/esss.2024.10098

EVALUATION

Q 1 Please summarize the main findings of the study.

This manuscript presents the results of a survey of geochemists in the UK and assesses changing demographics through the geochemistry career ladder. It presents demographic data on protected characteristics of the respondents (155) and interprets this through an intersectional lens. It usefully documents an apparent underrepresentation of multiply disadvantaged groups in geochemistry and a further loss of diversity up the career ladder. The manuscript, though limited in sample size, is a useful data point and important contribution to a growing body of literature on EDI in the geosciences.

Q 2 Please highlight the limitations and strengths.

The strengths of this manuscript is that the data analysed are collected through a voluntary survey where folks can identify themselves appropriately. E.g. many studies on EDI either assign gender based on name interpretation or algorithm and this erases non-binary genders and introduces racial bias (e.g. non-European names are not appropriately accounted for in these methods and so these people are often excluded). Further, the authors apply an intersectional lens and specifically compare multiply privileged vs multiply disadvantaged which is an important and welcome approach. The study, as with any that are based on voluntary survey, suffers from a small sample size and the bias introduced by self-selection (e.g. ECRs and those who face disadvantage are more likely to respond to EDI surveys). The manuscript lacks supporting data tables which I think should be included, including raw number of responses and comparison to larger datasets to contextualise this study. A limitation of this manuscript is that there is no respondent narrative of barriers faced, whether they had suffered discrimination, or what kind of changes would be useful. This would make the interpretations in the discussion and the recommendations more evidence based. Population-only data manuscripts are useful, but typically analyse larger datasets. The authors state they have this data but have chosen to publish it in a separate manuscript which I think limits the impact and strength of this present study.

Q 3 Please comment on the methods, results and data interpretation. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.

Under the Ethics section "Studies involving human subjects" the authors have ticked "Generated Statement: No human studies are presented in the manuscript". However, this is a study involving an online survey and therefore, is a study involving human participants so I would expect to see an ethics statement. I note in the acknowledgement that you thank the OU Ethics Committee, but I think this should be a section in either the methodology or supplementary material, depending on Journal guidelines. There is a lack of data presentation in this manuscript - I would expect to see data tables with your survey data included. This would be useful if compared to general UK population data and HESA data for academia, STEM and geosciences. This would contextualise the data that is specific to geochemistry.

Q 4 Check List

Is the English language of sufficient quality?

Yes.

Is the quality of the figures and tables satisfactory?

Yes.

Does the reference list cover the relevant literature adequately and in an unbiased manner?

Yes.

Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)

No.

If relevant, are the methods sufficiently documented to allow replication studies?

No.

Are the data underlying the study available in either the article, supplement, or deposited in a repository? (Sequence/expression data, protein/molecule characterizations, annotations, and taxonomy data are required to be deposited in public repositories prior to publication)

No.

Does the study adhere to ethical standards including ethics committee approval and consent procedure?

No.

If relevant, have standard biosecurity and institutional safety procedures been adhered to?

Not Applicable.

Q 5 Please provide your detailed review report to the editor and authors (including any comments on the Q4 Check List):

Overall I think this is an interesting study that contributes to a growing body of research on EDI in STEM and specifically the geosciences. In particular, I think the intersectional lens is important and a welcome approach. I attach a PDF with minor typos and comments and here include some general points for the authors and editor to consider. I hope that they find this useful – I think that this would be an important contribution and I am supportive of its publication.

I understand the framing of the background section – the idea that we need diverse talent for success in a discipline is an often used justification for EDI efforts. However, this business model of EDI is now often questioned – we should care about EDI as a matter for social justice not because of the benefits a diverse workforce can bring our institutions. Perhaps front social justice here?

There is no research question or hypothesis presented. Line 119 starts “To address this question” but doesn’t follow a question. At the end of the preceding paragraph, or at the start of this one, it would be useful to the narrative to frame this research – that it is focused on understanding how these broader issues of underrepresentation manifest in geochemistry and to explore the reasons particular to this discipline that may perpetuate this underrepresentation. For example, given the statistics presented in paragraph starting in Line 94, is it any wonder that geochemistry shows the same trends? Why is it important to look at the trends at the granular level (e.g. because there may be particular barriers related to the discipline that can be addressed, because evidence shows that targeted interventions are successful, as a call to the geochemistry organisations to take specific action...).

There are a couple of publications that specifically look at a variety of EDI concerns in geochemistry that have been omitted here (that also share common authors with this manuscript). These might have been omitted for good reason for example, because they use contested methods to assign gender binary for data collection. But if not, it seems a striking omission.

E.g.

Pourret, Olivier, et al. "Diversity, equity, and inclusion: Tackling under-representation and recognition of talents in geochemistry and cosmochemistry." *Geochimica et Cosmochimica Acta* 310 (2021): 363–371.

Pourret, Olivier, et al. "Gender balance and geographical diversity in editorial boards of *Geochimica et Cosmochimica Acta* and *Chemical Geology*." *European Science Editing* 48 (2022).

The sample size of 155 is stated, but the authors give no sense of how representative this sample is. Is this small or large? How does this effect your interpretation and your ability to quantify the trends seen? Are there 100s geochemists in the UK, or thousands? I appreciate that this is a very difficult thing to quantify – can the sample size be compared against e.g. Geochemistry Group membership to give a sense of the size of the community? Or some other way?

How do your data compare to the population of the UK? In the population, what proportion of each demographic would we expect to see? This is mentioned for one group in lines 409–411 but I think a comparative table would be a useful addition to this manuscript. This might give readers a sense of how disproportionately underrepresented some groups are in geochemistry. Also, are these groups generally underrepresented in geosciences? Or are they specifically underrepresented in geochemistry – i.e. is there something particular and unique to this discipline that is creating additional barriers and exclusion? In lines 404–5 you mention this is comparable to another survey but it would be useful to actually have some comparative numbers. Also, if that report exists what does this study specifically contribute beyond that report?

AthenaSwan has been criticised for advantaging specifically white women. You mention this earlier in your manuscript but don't return to it in the discussion where you call for more to be done to advance (binary) gender equality. Given this criticism of AthenaSwan, is more of the same what we need (as you suggest in line 339–341)? Or do we need our actions to be more specific and targeted? Be not only more inclusive of non-binary genders, racial minorities, LGBTQIA+ and disabled folk, but also be designed with their specific needs in mind?

Line 341 – I am confused by the use of 'leaky pipeline' here. The data presented is typical of a 'leaky pipeline' – loss of women and other marginalised groups as folks progress through the career pipeline. This persists despite actions such as AthenaSwan, but less so for cis white non-disabled women since AthenaSwan. The leaky pipeline metaphor is of course also challenged, with 'hostile climate' (e.g. <https://adgeo.copernicus.org/articles/53/117/2020/>) or chutes and ladders (<https://www.cambridge.org/core/journals/ps-political-science-and-politics/article/not-a-leaky-pipeline-academic-success-is-a-game-of-chutes-and-ladders/8AB9871A8978DEC799131FA6AA91363E>) proposed as better metaphors for the reality. Either way, its unclear here what your point is and how it relates to the leaky pipeline (or not).

Line 348–353 appears to contradict your statement in lines 339–341. Also, what about efforts such as the Race Equality Charter? And other initiatives? Your data suggests that these initiatives are not currently successful at increasing diversity at the senior level at this time. But there is an element of time here – those in senior positions who are 50+ would have been in cohorts with quite different demographics to your survey shows exists in the current PhD cohorts. I guess without any historical data you can't quantify this in anyway – are the more junior career stages more diverse than the senior today than they were say 5 or 10 years ago? I found the discussion a bit meandering. There wasn't a clear progression of thought or argument. For example, three of the paragraphs starts with 'Inclusion requires'. Was this purposeful? I didn't find it a helpful construct. Rather, it might be better if each paragraph focuses on interpreting a particular aspect of your data, for example, the lack of representation, the apparent inefficiency of positive action initiatives, the overrepresentation of multiply-disadvantaged folk on precarious contracts. And then, have a paragraph which brings this together to state what inclusion requires and your proposed actions. E.g. "Inclusion requires (1) representation (2) job security (3) intersectional understanding... We propose the following actions..." Etc. I find the result that there are more women and economically disadvantaged people in lab tech roles interesting, and there may be more to this than you can glean from your data. Anecdotally, I know that a lot of people choose lab tech roles as they are more stable then precarious PDRA etc contracts and are preferable to periods of unemployment. Is it that these groups feel this more strongly and so are more likely to be pushed out of the academic gauntlet and into these roles?

When reading through some of these suggestions about what some of these barriers might be and thinking on what the specifics to geochemistry were, I was lamenting the lack of narrative from respondents. But then in lines 421–423 the authors mention that this data was collected but not included here. My feeling is that this is a very powerful dataset and would really strengthen this manuscript, negating some of the challenges of having a quite small sample size. It would help in your interpretation of the statistics, and presented together the manuscript could have real impact. I would urge the authors to consider adding this data to this manuscript.

QUALITY ASSESSMENT

Q 6 → Originality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Q 7 → Rigor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q 8 → Significance to the field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Q 9 → Interest to a general audience	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q 10 → Quality of the writing	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Q 11 → Overall quality of the study	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>